Citation:

Graham JE, Snih SA, Berges IM, Ray LA, Markides KS, Ottenbacher KJ. Frailty and 10-year mortality in community-living Mexican American older adults. *Gerontology*. 2009; 55(6): 644-651. Epub 2009 Aug 18.

PubMed ID: 19690395

Study Design:

Prospective Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To determine the ability of a widely used measure of frailty to predict 10-year mortality in a large population-based sample of Mexican American older adults.

Inclusion Criteria:

- Mexican American
- Age 65 years or older.

Exclusion Criteria:

Participants requiring the assistance of a proxy.

Description of Study Protocol:

Recruitment

Community dwelling Mexican Americans age 65 years or older were selected from five southwestern states (Texas, California, Arizona, Colorado and New Mexico) using a multistage area probability cluster design [Hispanic Established Populations for the Epidemiologic Studies of the Elderly (EPESE)].

Design

Prospective cohort study.

Statistical Analysis

- Univariate analyses for death

- Chi square and T-tests for categorical and continuous variables
- Cumulative survival curve of relative mortality over time among the three levels of mortality
- Cox proportional hazards models to estimate frailty-related hazard ratios for mortality over 10 years, with the most advanced model adjusting for sociodemographic variables and health risk and medical condition risk factors
- Cox proportional hazards models to estimate the unadjusted 10-year mortality hazard ratio associated with each of the five frailty index items.

Data Collection Summary:

Timing of Measurements

- The study dataset covers the period from wave two (1995 to 1996) through wave five (1993 to 1994)
- Data were collected from in-person interviews and performance evaluations at each wave (approximately two-year intervals).

Dependent Variables

Mortality: Deaths were obtained through personal contact with the relatives and confirmation was collected from the National Death Index files.

Independent Variables

Frailty: Assessed by a five-item scale (weight loss, exhaustion, walking speed, grip strength, physical activity) where each item was scored dichotomously (zero or one) based on individuals' performance or response relative to thresholds.

- Non-frail: Score of zero
- Pre-frail: Score of one to two
- Frail: Score of three to five.

Control Variables

- Age
- Gender
- Body mass index (BMI)
- Marital status
- Medical conditions
- Smoking status
- Functional independence
- Cognitive status
- Depressive symptoms
- Self-rated overall health.

Description of Actual Data Sample:

- *Initial N:* 3,050 (original sample in 1993)
- *Attrition (final N):* 1,996 (after exclusion criteria, exclusion for missing data, loss to follow-up)
- *Age:* Mean (SD) of 74.5 (6.06) years

- *Ethnicity:* Hispanic
- *Other relevant demographics:* 41.5% male, 54.2% married
- *Anthropometrics:* Mean (SD) BMI of 28.05 (5.26) kg/m^2
- *Location:* Five southwestern US states.

Summary of Results:

Key Findings

In the fully adjusted model (controlling for sociodemographic, health-related factors and medical conditions), the pre-frail group experienced 1.25 times (95% CI: 1.07 to 1.46) the odds of mortality relative to the non-frail group, and the group classified as frail at baseline had an increased odds of 1.81 (95% CI: 1.41 to 2.31).

Other Findings

In the unadjusted analyses, mortality increased with frailty:

- Non-frail, 33.6%
- Pre-frail, 48.7%
- Frail, 84.5%.

Author Conclusion:

Frailty status is associated with increased 10-year mortality in older Mexican Americans.

Reviewer Comments:

Study Strengths

- *Large, community-based and representative sample*
- *10-years of follow-up*
- *Mortality outcome confirmed with death records.*

Study Limitations

- *Frailty index (exposure) may not precisely measure frailty*
- *Self-reported medical conditions*
- *Sample excluded those in nursing homes or other institutional environments, so study associations may be underestimates of relationship between frailty and mortality.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes

2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes

3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	No
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	N/A
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	N/A
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes

9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes